BepiColombo PDS4 Progress Report

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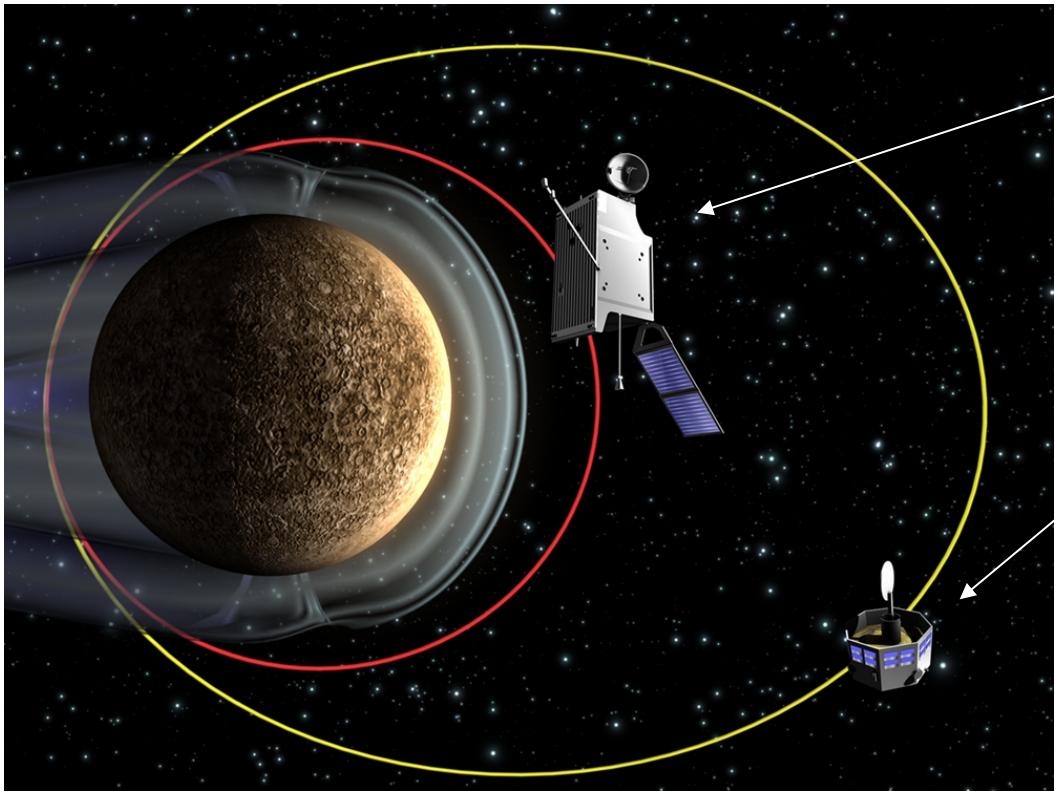
Mission Overview

- Scheduled for launch in 2016. Start of science mission in 2023.
- Mission duration: 1 year nominal mission + 1 year potential extension.



Mercury Planetary Orbiter (MPO)

- Polar orbit optimized for study of the planet itself
- 400x1500 km, 2.3h period
- Data volume ~1550Gbits/year
- Mainly nadir pointing

Mercury Magnetospheric Orbiter (MMO)

- Polar orbit optimized for study of the magnetosphere
- 400x12000 km, 9.2h period
- Data volume ~100Gbits/year

Archiving Activities Status

- A *Data Handling and Archiving Working Group (DHAWG)* was created in November 2012 and is meeting regularly via teleconference (monthly).
- A *Data Handling and Archiving Concept* was presented to the PI teams in November 2012 and March 2013 (refined version incorporating inputs from the teams). Feedback received from the instrument teams has been very positive.
- Draft versions of the *Archive Plan* and *Archive Conventions* documents prepared and presented to the PI teams in March 2013. Instrument teams inputs needed for the descriptions of the data products. First issue to be ready by September 2013.
- *Experiment to Archive ICDs* preparation (equivalent to SIS) to start in April 2013. Draft versions to be ready by September 2013.

PDS4 Related Activities (I)

- *BepiColombo PDS4 Data Modeling Activity*
  - BepiColombo PDS4 schemas repository was set up in November 2012.
  - Preliminary PDS4 raw data models (schemas and label templates) prepared and presented to the PI teams in November 2012. Further development of these models is now under the responsibility of the PI teams.

- *Pipeline Prototyping.* PDS4 pipeline prototyping (using data from on-ground testing) will start in April and is expected to last until June 2013.

- *MPO Demonstrable Pipelines (by launch)*. Based on criteria which take into account the usefulness of data collected during cruise (e.g. to support calibration activities), PI plans and relevant schedule for the implementation of the data processing pipelines, four instruments (SIXS, MERTIS, ISA and MPO-MAG) were selected for data processing launch readiness.
  - Kick-off telecons with the selected instrument teams took place in February 2013.
  - On-going: agree a road-map with the instrument teams for the implementation.

PDS4 Related Activities (II)

- *Data Processing Levels Definition.* ESA/PSA (driven by the BepiColombo DHAWG discussions) sent a request for changes to the processing levels defined in PDS4. The proposal was discussed by the PDS DDWG and approved by the PDS Management Council in March 2013.

- *PDS4 Development Follow-up*. Currently using version 0310a of the PDS schemas. Version 0310b will be tested and reviewed in April 2013. Documentation and tools will be reviewed in April-May 2013.

- *PDS4 Training–Meeting*. An agenda was proposed by ESA/PSA (based on BepiColombo needs) and was discussed with PDS in February 2013. Both JAXA and ESA are interested in attending. Currently scheduled for May 2013 (dates TBC).

*Feedback to PDS in all BepiColombo PDS4 related activities will be provided through the **IPDA PDS4 Implementation Project.***

BepiColombo MPO Raw Data Products

Mercury Planetary Orbiter (MPO)			
Instrument		***Data Product***	***PDS4 Data Format(s) - Work in progress***
BELA	BepiColombo Laser Altimeter	HK and SC (TBC if possible for all modes)	Table_Character
ISA	Italian Spring Accelerometer	HK and SC	Table_Character
MPO/MAG	Magnetic Field Investigation	HK and SC	Table_Character
MERTIS	Mercury Radiometer and Thermal Imaging Spectrometer	PEL/PSSL calibration data	Table_Character
MGNS	Mercury Gamma-Ray and Neutron Spectrometer	SC	Table_Character + Array_2D_Spectrum(s)
MIXS	Mercury Imaging X-ray Spectrometer	MIXS-C and MIXS-T	Table_Character(s) + Array (TBC)
MORE	Mercury Orbiter Radio Science Experiment	Needs further discussion.	TBC
PHEBUS	Probing of Hermean Exosphere by UV Spectroscopy	Needs further discussion.	FITS
SERENA	Search for Exospheric Refilling and Emitted Natural Abundances	Needs further discussion.	FITS (TBC)
SIXS	Solar Intensity X-ray and particle Spectrometer	SIXS-X and SIXS-P	Header + Table_Binary (FITS)
SIMBIO-SYS	Spectrometers and Imagers for MPO BepiColombo Integrated Observatory	HRIC SC VIHI SC SRC SC	Array_2D_Image Array_3D_Image Array_2D_Image

BepiColombo MMO Data Products

Mercury Magnetospheric Orbiter (MMO)			
Instrument		***Data Product***	***PDS4 Data Format(s)***
MMO/MAG	MMO Mercury Magnetometer	To be defined.	
MPPE	Mercury Plasma Particle Experiment		
MSASI	Mercury Sodium Atmospheric Spectral Imager		
PWI	Mercury Plasma Wave Instrument		
MDM	Mercury Dust Monitor		

MPO – MMO Archiving Interface Status

- MMO (JAXA) and MPO (ESA) archiving representatives meet regularly (videoconference every 2-3 months) to ensure coordination in all archiving aspects, including the use of PDS4.

- MMO instruments will use CDF and/or ASCII tables. BepiColombo representatives from JAXA and ESA are working together to define CDF data formats compatible with PDS4.

- *CDF and PDS4 compatibility issues* will be addressed during the PDS4 Training – Meeting being organised by PDS/PSA (May 2013).